

## Review of the subspecies of *Spilarctia leopardina* (KOLLAR, [1844])

(Lepidoptera, Arctiidae)

by

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**Abstract:** The subspecies of *Spilarctia leopardina* KOLLAR, 1844 are revised. *Arctia divisa* WALKER, 1855 and *Ardices liturata* WALKER, 1869 are confirmed to be synonyms of the nominotypical subspecies which is characterized by absence of the continuous medial transversal band on forewing and, normally, absence of a rose tint on the hindwing. Two additional subspecies are described: *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA **subsp. nov.** from central part of Nepal with very dark forewings with a dark space along the cubital vein not crossed by a light transversal band, and rose anal margin on the hindwing; *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG **subsp. nov.** from East Nepal and south-western slope of the Himalaya in the Chinese Tibet with rose hindwings and presence of a continuous medial transversal band on the forewing.

**Zusammenfassung:** Die Unterarten von *Spilarctia leopardina* KOLLAR, 1844 werden revidiert. *Arctia divisa* WALKER, 1855 und *Ardices liturata* WALKER, 1869 werden revidiert und mit der namenstypischen Unterart synonymisiert. Diese ist durch das Fehlen einer durchgehenden medialen Querbinde auf den Vorderflügeln und das normalerweise Fehlen einer Rosafärbung auf den Hinterflügeln charakterisiert. Es werden zusätzlich zwei neue Unterarten beschrieben: *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA **subsp. nov.** aus Zentral-Nepal und *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG **subsp. nov.** aus Ost-Nepal.

*Spilarctia leopardina* (KOLLAR, [1844]) was described from the Himalaya mountains without citing an exact locality. Few years later, two more taxa, very similar to this species, were described from the North-West Himalaya: *Arctia divisa* WALKER, 1855 and *Ardices liturata* WALKER, 1869. They were synonymized with *Spilarctia leopardina* KOLLAR by HAMPSON (1894, 1901), but for a long time were not revised. After discovering a great geographic variability of this species in Nepal by KISHIDA (1994, 1995), it was impossible to evaluate a real taxonomic value of the different colour forms of *S. leopardina* from this country. Now, through the courtesy of Dr. M. HONEY, the types by WALKER within the *S. leopardina*-group were examined, and it became clear that Nepal is inhabited by three subspecies of *S. leopardina* KOLL. This allows us to prepare a review of the subspecies of this species. The material studied is deposited in the collections of Naturhistorisches Museum Wien, Austria (NHMW), the British Museum (Natural History), London, UK (BMNH), Siberian Zoological Museum of the Institute of Animal Systematics and Ecology, Novosibirsk, Russia (SZMN), Institute of Zoology, Academia Sinica.

Beijing, China (ZIAS), the private collections of Y. KISHIDA, Tokyo, Japan (YK), V.O. GURKO, Chernovtsy, Ukraine (VG), and A. GORODNITSKY, Moscow, Russia (AG).

*Spilarctia leopardina* (KOLLAR, [1844])

Distribution. India: the North-West Himalaya, including Manali and Simla in Himachal Pradesh, Almora and Kumaon in Uttar Pradesh (HAMPSON, 1901; STRAND, 1919). The localities from Manpuri (HAMPSON, 1901), Sikkim and Khasi Hills in Meghalaya (HAMPSON, 1894) look to be mistakes. In 20th century this species was found throughout Nepal (KISHIDA, 1994, 1995), and in the Chinese Tibet (FANG, 1985, 2000), but only on the south-western slope of the Himalaya in Gyirong and Zhangmu (FANG, 1987).

*Spilarctia leopardina leopardina* (KOLLAR, [1844])

(colour plate 10, figs 1, 2; col. pl. 11, figs 1-9; col. pl. 12, figs 1, 2)

*Euprepia leopardina* KOLLAR, [1844]; in HÜGEL, Kaschmir 4 (2): 467, t. 21, fig. 2.

*Arctia divisa* WALKER, 1855; List Spec. lepid. Ins. Colln. Br. Mus. 3: 614-615.

*Arctides liturata* WALKER, 1869; Char. Lep. Het.: 12.

*Diacrisia leopardina*, HAMPSON, 1901; Cat. Lep. Phal. Br. Mus. 3: 288.

*Diacrisia leopardina*, STRAND, 1919; Lep. Cat. 22: 184-185.

Type material examined. Lectotype ♂ of *leopardina* KOLLAR, here selected, with the following labels: "Hügel. / *Himalaya* / 300." and "*Euprepia* / *leopardina* / Koll. Type ♂" Paralectotype ♀ of *leopardina* KOLLAR, with the following labels: "HÜGEL / *Himalaya*" and "*Euprepia* / *leopardina* / Koll. Type ♀" Both deposited in NHMW. Lectotype ♂ of *divisa* WALKER, here selected, with the following labels: "39. *Arctia divisa*.", "N. India / Kmorah / 48-131.", "SYN- / TYPE", "Arctiidae / genitalia slide / No. 3413", deposited in BMNH. Type ♀ of *liturata* WALKER, with labels: "*liturata*", "Type", "Coll. MOORE. / 94-67.", "Arctiidae / genitalia slide / No. 3410", deposited in BMNH.

Other material examined: INDIA, Himachal Pradesh: 1 ♂, Manali, h=1800 m a.s.l., no data, RIEGER leg. (SZMN); the same locality, h=2600 m a.s.l., 25.VII.2003, A. GORODINSKY (AG); WEST NEPAL, Mahakali: 1 ♂, Raakang, h=3275 m a.s.l., 30.VI.1995, anonymous leg. (SZMN); 1 ♀, Tata, h=4490 m a.s.l., 9.VII 1995, anonymous leg. (SZMN); 4 ♂♂, Kuntisong, 2900 m a.s.l., 26.-29.VI.1995, anonymous leg. (SZMN).

Distribution: The North-West Himalayas, within Himachal Pradesh, Arunachal Pradesh, India, and North-Western Nepal.

Diagnosis: This subspecies is characterized by presence of a dark elongate spot along the cubital vein (the hind vein of the cell), and usually inside the cell and behind it. There are several small spots along the costa, usually fused with the dark spot along the cubital vein. A dark forewing hind border is crossed only by the postdiscal band, while the median one does not extends beyond the vein A. All the veins are light. The hindwings are usually dark, with small light spots along the outer margin, or only near the tornus. Sometimes the light ground colour more or less displaces the dark pattern (colour plate 11, fig. 4, 9). No rose or red colour is present on the

hindwing; if it is abnormally present as a light aberration occurring among typical specimens (colour plate 12, fig. 1, 2), the dark spot along the cubital vein is not crossed by light bands.

♂ genitalia (fig. 1, 3-8): Valva with three small processes, two apical one and one subapical one on the ventral edge, which is often located closely to apex so that the distance between apical and subapical processes is more or less equal to distance between two apical processes. Nevertheless, the size of these processes vary significantly.

♀ genitalia (fig. 2): Vaginal sinus broad, ductus broad, noticeably bent on the left; bursa global, with two small signi and large global bulla.

Remarks: The two taxa of Walker (1855, 1969) were described by specimens with strongly expressed light ground colour while the species was described by a dark ♂ specimen.

*Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA **ssp. nov.**

(colour plate 12, figs. 3, 4)

*Spilarctia leopardina*, KISHIDA (1995: 41, pl. 107, fig. 2, 3)

Material: Holotype ♂, NEPAL, Inner Himal, Dhaulagiri, Mustang, Muktinath, 3,800 m, 18-19.VII.1994, M.S.LIMBU leg. (SZMN). Paratypes: NEPAL, Dhaulagiri: 6 ♂♂, 1 ♀, the locality as in the holotype, 6-7.VII.1994, M. S. LIMBU leg. (YK, SZMN); 1 ♂, Tukuche, h=2500 m a.s.l., 5.-7.VI.1997, M. PETERSEN leg. (SZMN); 1 ♂, Larjung, h=2650 m a.s.l., 8.-10.VI.1997, M. PETERSEN leg. (SZMN); 5 ♂♂, 1 ♀, Muktinath, h=3800 m a.s.l., 25.-27.V.1993, anonymous leg. (YK); 1 ♂, 1 ♀, Marpha, Yak-Kharke, 4000 m e.s.l., ex ovo, 17.VI.1998, LINGENHOLE leg. (YK); 1 ♂, Marpha, Yak-Kharke, 10.VI.1997, LINGENHOLE leg. (YK); Gandaki: 1 ♂, Nilgiri, Lete, 2400 m a.s.l., 20.VI.1969, T. MIYASHITA leg. (YK); 1 ♂, Kali Gandaki, Kalbani, 2400 m a.s.l., 12.VII.1969, T.MIYASHITA leg. (YK).

Description: Forewing length 18-19 mm. Forewings with a strongly expressed dark pattern. A large dark spot occupies cell and a space behind it; this spot broadly touches costal margin. It embraces small light spot near costal edge at proximal one-third of the wing length; this spot never crosses cubital vein (hind vein of cell). There are also a dark subapical spot on costa, an oblique band going from apex to hind margin, and fused marginal and submarginal bands. A dark hind border occupies space along vein A, it is crossed by two transversal lines, the postdiscal one crosses the border, while the median one does not cross vein A. All veins on forewing are light. Hindwings dark, with few small submarginal light spots near tornal angle, anal margin red with red hairs.

♂ genitalia (fig. 9-12). Subapical processus often located apart from the two apical ones, which are of more or less equal sizes.

Remarks: The main characters of the subspecies are:

1: presence of a red colour at the anal margin of almost dark hindwings;

median band does not cross the forewing, it is reduced to a small spot near the costa and a small transversal line between the cell and vein A.

*Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG **subspec. nov.**

(colour plate 12, fig. 5-9)

*Spilarctia leopardina*, FANG (1985): Economic Insect fauna of China **33**: 50, pl. IV, fig. 57; FANG (1987): Agric. Ins., Spid., Plant Dis. and Weeds of Xizang: 260; FANG (2000): Fauna Sinica **19**: 431, pl. XVII, fig. 15.

*Spilarctia leopardina*, KÔDA (1988): Tyô to Ga **39** (1): 77, fig. 117 G-H.

*Spilarctia leopardina* [sic!], KISHIDA (1994): Moths of Nepal **3**: 68, pl. 79, fig. 9.

Material. Holotype ♂, NEPAL, Godavari, 1.VII.1996, anonymous leg. (SZMN). Paratypes: EAST NEPAL: 6 ♂♂, Godavari, 30.VI.-9.VII.1996, anonymous leg. (SZMN); 1 ♂, Khumbu Himal, Bhothe Kosi riv., Thamo, h=3440 m a.s.l., 12.V.1996, V.MURZIN (SZMN); 1 ♀, Kosi, Basantpul, h=2300 m a.s.l., 23.VI.1992, T. HARUTA leg. (YK); 8 ♂♂, Koshi, Chittrei, 24.VI.1992, anonymous leg. (YK); 2 ♂♂, Kosi, Basantapur, 22.-23.VI.1992, anonymous leg. (YK); 1 ♂, Sagarmatha, Okhaldhunga, 4.VII.1990, anonymous leg. (YK); 1 ♂, Sagarmata, Lukla, h=2870 m a.s.l., 19.-20.V.1995, T. HARUTA leg. (YK); 8 ♂♂, Janakpur, Jiri, h=1900 m a.s.l., 23.IV., 2.VI.1992, 28.-29.V.1994, anonymous leg. (YK, SZMN); 1 ♂, same locality, h=2350 m a.s.l., 27.VI.1993, S. M. LIMBU leg. (YK); 15 ♂♂, same locality, h=2350 m a.s.l., VI.-VII.1994, anonymous leg. (YK); 3 same locality, h=2800 m a.s.l., 10.-25.VIII.1999, V. GURKO leg. (VG); 2 ♂♂, Janakpur, Riggi Su, 15.VII.1993, anonymous leg. (YK); 1 ♂, Janakpur, Deolari, h=2800 m a.s.l., 25.V.-7.VI.1994, M. S. LIMBU leg. (YK). CHINA, Tibet: 39 ♂♂, 1 ♀, Zhangmu (27.9°N 85.9°E), 25.VI.-4.VII.1975, WANG ZIQING leg. (IZAS). Other material studied: CHINA, Tibet: 23 ♂♂, Gyirong (28.4°N 85.2°E), 26.VII.-2.VIII.1975, WANG ZIQING leg. (IZAS).

Description: Forewing length 20-21 mm. Forewings with a strongly expressed light ground colour. Dark forewing base separated from dark spot in and around cell distal part by a continuous light medial band. Sometimes on forewings, there is also a light spot in cell distal part, which touches costal margin (colour plate ??, fig. 18). Other elements of the forewing pattern are the same as in the nominotypical subspecies, but the light medial band fully crosses the dark hind border. The most outstanding character of the subspecies are its almost rose hindwings, usually with a large dark discal spot, fused submarginal band, small marginal spots and few spots on the costal margin. In few specimens from the type series there is a narrow postdiscal band on the hindwings (colour plate 12, fig. 6).

genitalia (fig. 13-19): Valvae structure varies significantly, but usually with subapical processus more or less larger than ventral apical one.

Remarks: Among the series from Gyirong, which is located on the south-western slope of the Himalaya in the Chinese province of Tibet, together with typical specimens of *S. l. rosepuma* **subspec. nov.**, there were collected some specimens with very dark hindwings, with numerous small rose-red markings and an entirely rose-red coloration along the anal margin (fig. 9); such a specimen was figured by FANG (1985). Among 23 specimens from Gyirong, 11 have dark

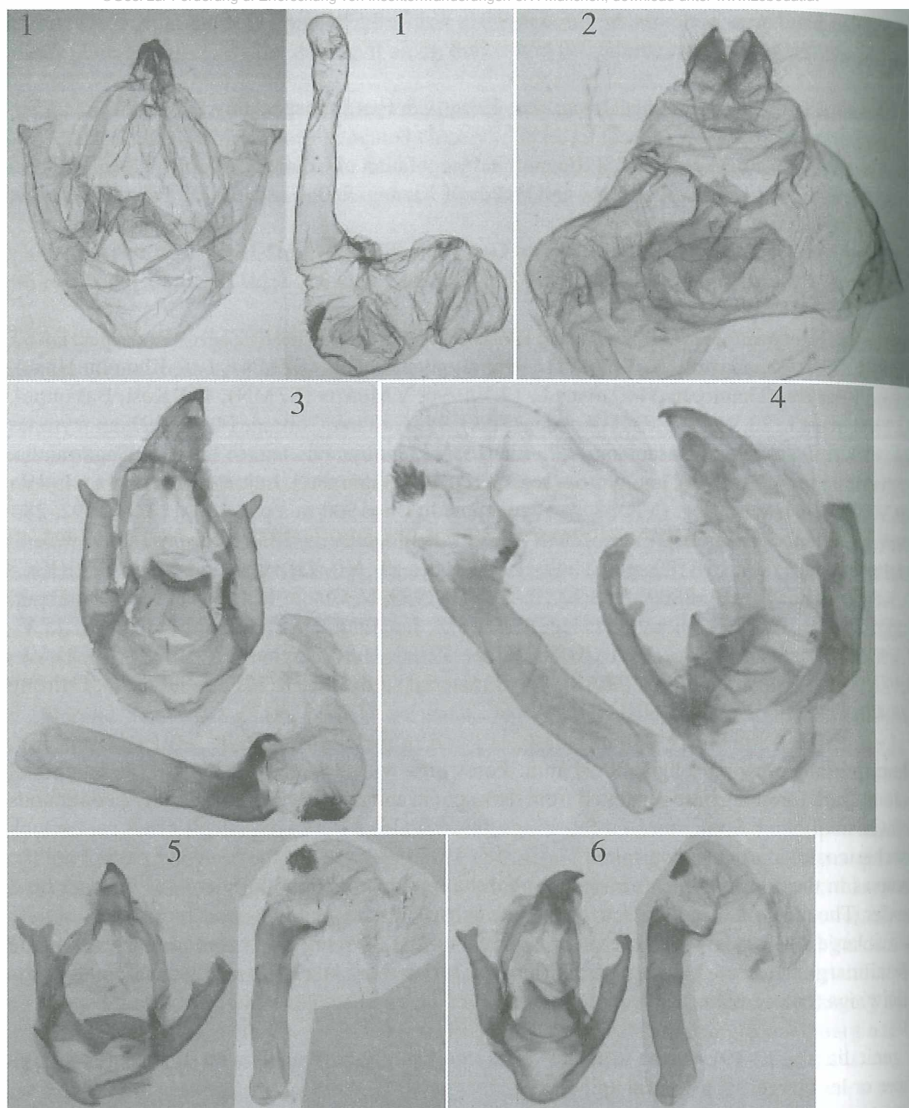


Fig. 1: ♂ genitalia of *Spilarctia leopardina leopardina* KOLLAR, lectotype of *divisa* WALKER, N. India, Kmorah.  
 Fig. 2: ♀ genitalia of *Spilarctia leopardina leopardina* KOLLAR, type of *liturata* WALKER.  
 Fig. 3: ♂ genitalia of *Spilarctia leopardina leopardina* KOLLAR, India, Himachal Pradesh, Manali, 1800 m.  
 Fig. 4-6: ♂ genitalia of *Spilarctia leopardina leopardina* KOLLAR, specimens with black hindwings, W. Nepal, Mahakali, Kuntisong, 2900 m, 26., 27., 29.VI.1995, anonymous leg.

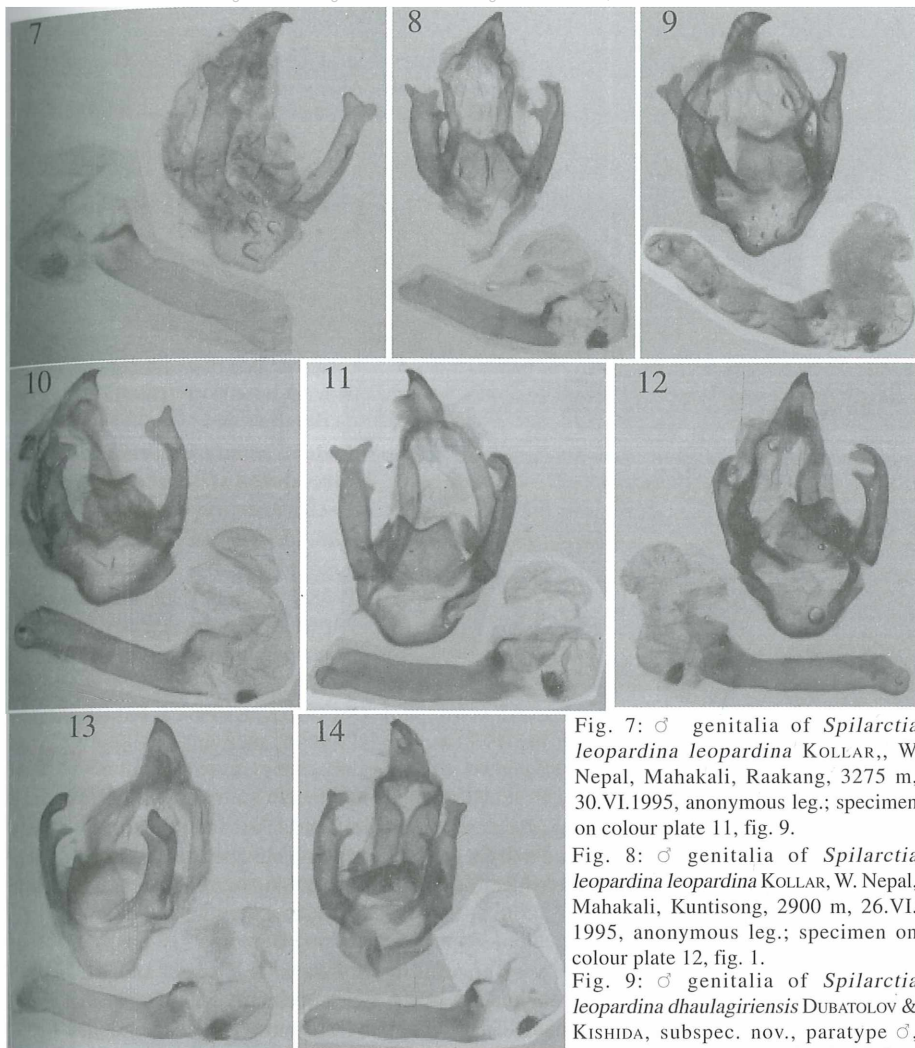


Fig. 7: ♂ genitalia of *Spilarctia leopardina leopardina* KOLLAR., W Nepal, Mahakali, Raakang, 3275 m, 30.VI.1995, anonymous leg.; specimen on colour plate 11, fig. 9.

Fig. 8: ♂ genitalia of *Spilarctia leopardina leopardina* KOLLAR., W. Nepal, Mahakali, Kuntisong, 2900 m, 26.VI.1995, anonymous leg.; specimen on colour plate 12, fig. 1.

Fig. 9: ♂ genitalia of *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subsp. nov., paratype ♂, Nepal, Dhaulagiri, Tukuhe, h=2500 m a.s.l., 5.-7.VI.1997, M.PETERSEN leg.

Fig. 10: ♂ genitalia of *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subsp. nov., paratype ♂, Nepal, Dhaulagiri, Larjung, 2650 m, 8.-10.VI.1997, M.PETERSEN leg.

Fig. 11: ♂ genitalia of *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subsp. nov., paratype ♂, Nepal, Inner Himal, Dhaulagiri, 6.-7.VII 1994, M. S. LIMBU leg.

Fig. 12: ♂ genitalia of *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subsp. nov., paratype ♂, E Nepal, Khumbu Himal, Bhote Kosi riv., Thamo, 3440 m, 12.V.1996, V. MURZIN.

Fig. 13-14: ♂ genitalia of *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG., subsp. nov., paratype ♂, Nepal, Godavari, 30.VI, 9.VII 1996, anonymous leg.



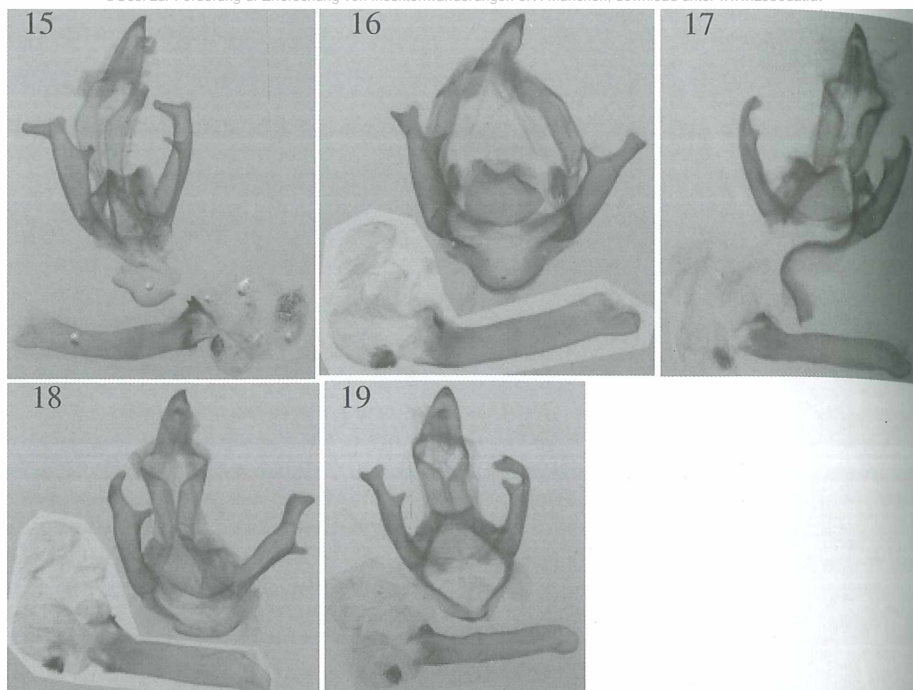


Fig. 15-19: ♂ genitalia of *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG., subsp. nov., paratype ♂, E. Nepal, Janakpur, Jiri, 1900 m, 28.-29.V.1994, anonymous leg.

hindwings and 12 have rose hindwing. Because the medial band in all such specimens crosses the forewing from the costa to the hind margin (sometimes this band does not cross vein A, but always crosses the cubital vein), we consider this population to belong to *S. l. rosepuma* subsp. nov.

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## Colour plate 10

Fig. 1: *Spilarctia leopardina leopardina* KOLLAR, lectotype ♂, Himalaya.

Fig. 2: *Spilarctia leopardina leopardina* KOLLAR, labels of the lectotype ♂.

## Colour plate 11

Fig. 1: *Spilarctia leopardina leopardina* KOLLAR, labels of the paralectotype ♀.

Fig. 2: *Spilarctia leopardina leopardina* KOLLAR, paralectotype ♀, Himalaya.

Fig. 3: *Spilarctia leopardina leopardina* KOLLAR, labels of *divisa* Walker lectotype ♂.

Fig. 4: *Spilarctia leopardina leopardina* KOLLAR, lectotype ♂ of *divisa* Walker, N. India, Kmorah.

Fig. 5: *Spilarctia leopardina leopardina* KOLLAR, labels of *liturata* Walker type ♀.

Fig. 6: *Spilarctia leopardina leopardina* KOLLAR, type ♀ of *liturata* Walker.

Fig. 7: *Spilarctia leopardina leopardina* KOLLAR, ♂, India, Himachal Pradesh, Manali, 1800 m.

Fig. 8: *Spilarctia leopardina leopardina* KOLLAR, ♂, India, Himachal Pradesh, Manali, 2600 m, 25.VII.2003, A. GRODNITSKY leg. et coll.

Fig. 9: *Spilarctia leopardina leopardina* KOLLAR, ♂, W Nepal, Mahakali, Raakang, 3275 m, 30.VI.1995.

## Colour plate 12

Fig. 1, 2: *Spilarctia leopardina leopardina* KOLLAR, ♂, W. Nepal, Mahakali, Kuntisong, 2900 m, 26.VI.1995.

Fig. 3: *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subsp. nov., holotype ♂, Nepal, Inner Himal, Dhaulagiri, Mustang, Muktinath, 3,800 m, 18.-19.VII.1994, M. S. LIMBU leg.

Fig. 4: *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subspec. nov., paratype ♂,



Nepal, Dhaulagiri, Mustang, Muktinath, 3,800 m, 6.-7.VII.1994, M. S. LIMBU leg.

Fig. 5: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., holotype  
Nepal, Godavari, 1.VII.1996.

Fig. 6: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., paratype  
Nepal, Godavari, 30.VI.1996.

Fig. 7: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., paratype  
Nepal, Jiri, 29.V.1994, anonymous leg.

Fig. 8: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., ♂, China,  
Tibet, Gyirong, 31.VII.1975.

Fig. 9: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., ♂, China,  
Tibet, Gyirong, 26.VII.1975.

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## Farbtafel 11/ Colour plate 11

DUBATOLOV, V. V., KISHIDA, Y. & CH. FANG: Review of the subspecies of *Spilarctia leopardina* KOLLAR, 1844 (Lepidoptera, Arctiidae). - Atalanta (Juli 2005) 36 (1/2):180-188, Würzburg.

- Fig. 1: *Spilarctia leopardina leopardina* KOLLAR, labels of the paralectotype ♀.  
Fig. 2: *Spilarctia leopardina leopardina* KOLLAR, paralectotype ♀, Himalaya.  
Fig. 3: *Spilarctia leopardina leopardina* KOLLAR, labels of *divisa* Walker lectotype ♂  
Fig. 4: *Spilarctia leopardina leopardina* KOLLAR, lectotype ♂ of *divisa* Walker, N. India, Kmorah.  
Fig. 5: *Spilarctia leopardina leopardina* KOLLAR, labels of *liturata* Walker type ♀.  
Fig. 6: *Spilarctia leopardina leopardina* KOLLAR, type ♀ of *liturata* Walker.  
Fig. 7: *Spilarctia leopardina leopardina* KOLLAR, ♂, India, Himachal Pradesh, Manali, 1800 m.  
Fig. 8: *Spilarctia leopardina leopardina* KOLLAR, ♂, India, Himachal Pradesh, Manali, 2600 m, 25.VII.2003, A. GRODNITSKY leg. et coll.  
Fig. 9: *Spilarctia leopardina leopardina* KOLLAR, ♂, W Nepal, Mahakali, Raakang, 3275 m, 30.VI.1995.

# Farbtafel 11/ Colour plate 11



## Farbtafel 12/ Colour plate 12

DUBATOLOV, V. V., KISHIDA, Y. & CH. FANG: Review of the subspecies of *Spilarctia leopardina* KOLLAR, 1844 (Lepidoptera, Arctiidae). - Atalanta (Juli 2005) 36 (1/2):180-188, Würzburg.

Fig. 1-2: *Spilarctia leopardina leopardina* KOLLAR, ♂, W. Nepal, Mahakali, Kuntisong, 2900 m, 26.VI.1995.

Fig. 3: *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subsp. nov., holotype ♂, Nepal, Inner Himal, Dhaulagiri, Mustang, Muktinath, 3,800 m, 18.-19.VII.1994, M. S. LIMBU leg.

Fig. 4: *Spilarctia leopardina dhaulagiriensis* DUBATOLOV & KISHIDA, subspec. nov., paratype ♂, Nepal, Dhaulagiri, Mustang, Muktinath, 3,800 m, 6.-7.VII.1994, M. S. LIMBU leg.

Fig. 5: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., holotype ♂, Nepal, Godavari, 1.VII.1996.

Fig. 6: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., paratype ♂, Nepal, Godavari, 30.VI.1996.

Fig. 7: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., paratype ♂, Nepal, Jiri, 29.V.1994, anonymous leg.

Fig. 8: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., ♂, China, Tibet, Gyirong, 31.VII.1975.

Fig. 9: *Spilarctia leopardina rosepuma* DUBATOLOV, KISHIDA & FANG, subspec. nov., ♂, China, Tibet, Gyirong, 26.VII.1975.

## Farbtafel 12/ Colour plate 12

